

solid waste landfill; for operation of waste treatment and storage facilities; for waste characterization and disposal; for maintenance of non-leased roads, grounds, and facilities; for surveillance and maintenance of UF<sub>6</sub> cylinders; for construction of new cylinder yards; for maintenance of closed landfills and burial sites; for environmental monitoring; and for environmental restoration. Bechtel Jacobs is the management and integrating contractor for DOE, having been awarded this contract in April 1998. Bechtel Jacobs relies on subcontractors to conduct environmental restoration and waste management functions.

USEC leased the enrichment production facilities on July 1, 1993, and contracted with Lockheed Martin Utility Services as the operating and maintenance contractor until May 1999, when USEC assumed direct operation of the enrichment activities. The NRC performs regulatory oversight of USEC activities. The Occupational Safety and Health Administration regulates USEC occupational worker safety and health, and the Commonwealth of Kentucky and the EPA regulate USEC environmental activities. USEC-leased facilities consist of process buildings, electrical switchyards, a steam plant, a water treatment facility, a chemical cleaning and decontamination facility, and maintenance and laboratory facilities. Over its operating lifetime, PGDP has processed more than 1,000,000 tons of uranium. The process of enriching uranium at PGDP involves heating UF<sub>6</sub> into a gas, which is in turn fed through a series of diffusion stages; PGDP has over 1,800 diffusion stages. The diffusion process generates enriched uranium product and tails. The product (or slightly enriched material) is shipped to the Portsmouth Gaseous Diffusion Plant in Ohio, where it is normally enriched to 3 to 5 percent uranium-235. The tails, typically containing less than 0.5 percent uranium-235, remain on site in cylinders.

## 1.3 Investigative Approach

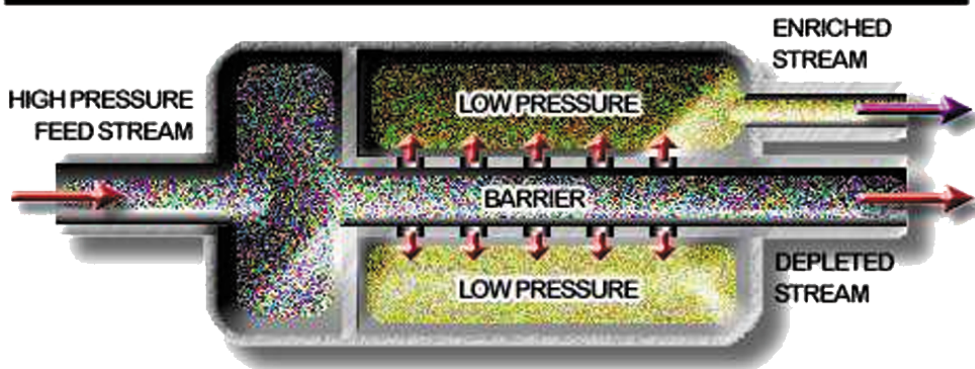
To support the overall objective of determining whether ES&H activities and practices that existed from 1952 to 1990 were consistent with the knowledge, standards, and local requirements applicable at the time, the Office of Oversight investigation team interviewed current and former site personnel, reviewed documents, walked down high hazard areas of the Plant, and conducted surveys of selected items of potentially contaminated equipment, materials, and waste storage areas.

The Oversight team conducted more than 200 interviews with current and former site employees, including Oak Ridge Operations Office (OR) and Paducah Site Office (PSO) personnel; USEC, Bechtel Jacobs, and previous contractor and subcontractor managers, supervisors, and workers; and stakeholders. Many of these interviews resulted from a solicitation that the investigation team placed in local newspapers requesting information on past (1952-1990) Plant operations, ES&H practices, and specific events that could have affected worker and public safety and environmental protection. These interviews also provided the investigation team with a preliminary indication of the degree to which ES&H practices and controls were consistent with and appropriate to the standards of the day throughout the Plant. This information allowed the team to identify certain ES&H practices for more detailed document and literature review.

The investigation team reviewed thousands of historical documents, including plans, procedures, operations logs, assessments, analyses, and memoranda. These reviews supplemented the information from interviews and clarified the chronology of events at PGDP. The team also examined documents addressing past standards to provide a framework for understanding ES&H requirements and expectations prior to 1990. Many records were obtained from PGDP archives documenting past releases of radioactive and hazardous materials and their potential impacts on workers, the public, and the environment.

To supplement the interview and document

### ***GASEOUS DIFFUSION STAGE***





**Recent Sampling Activity**

review processes, the investigation team walked down high hazard buildings and surveyed a variety of equipment, material, and waste storage areas. Radiological surveys were performed at a variety of locations, both inside and outside the perimeter security fence.

This extensive data collection process allowed the investigation team to proceed in a structured fashion to (1) determine whether ES&H activities and practices from 1952 to 1990 were consistent with the knowledge, standards, and local requirements applicable at the time, and (2) identify any ES&H concerns that had not previously been documented.

## 1.4 Data Considerations

The scope of the Phase II portion of the investigation required that the investigation team examine legacy data and information. This involved both the review and evaluation of archived material and the assessment of recorded interviews documenting individuals' recollections of previous events and conditions. The investigation team recognized the inherent difficulty of current and former workers' accurately recalling details related to activities and events happening 20 to 40 years ago. While the interview solicitation indicated the team's desire to speak with personnel who were involved in a variety of functions at the Plant, many individuals were self-selected for the interviews; that is, their participation resulted from their personal interest in the investigation. Accordingly, the team was cautious and conservative in its use of information recorded in interviews for judgments contained in this report.

The identification and review of historical documentation was a tedious and time-consuming process. Many historical PGDP documents were not catalogued or filed in central locations. Many documents could not be located, and some records that were examined were contaminated or located in abandoned, contaminated buildings. Due to the volume of records and other documentation generated over almost 40 years, it was not possible to locate and review all documents. Documents were examined based on focused subject searches and targeted sampling.

## 1.5 Report Structure

The balance of this document is structured to provide the reader with a comprehensive understanding of past activities at PGDP and a thorough description of operational, maintenance, and environmental management practices and their effectiveness in minimizing impacts on workers, the public, and the environment. To ensure that the full range of information is provided in an understandable manner, the balance of the report is organized into a series of discussions outlining various elements of the Plant's operation in the context of when and how they were conducted. Accordingly, Section 2 of the report provides a chronological description of past activities at PGDP within a series of functional areas that summarize key operations relating to the safety and health of workers, the public, and the environment. The objective of Section 2 is to provide to the reader an overall understanding of the major activities performed at PGDP and to indicate how these activities may have changed over time.

Section 3 describes in detail the hazards that existed at PGDP; operational and maintenance activities; practices used to identify, monitor, and control these hazards; and the effectiveness of these practices in addressing these hazards. Similarly, Section 4 describes past environmental management practices at the Plant and their effectiveness in mitigating impacts to the public and the environment. Section 5 provides the investigation team's findings regarding ES&H activities and practices from 1952 to 1990. The roster of the Office of Oversight investigation team is provided in Appendix A. Appendix B summarizes the principal hazardous activities conducted at PGDP during the period 1952 to 1990 and provides an assessment of the hazards presented by these activities, the controls used to mitigate the hazards, and the effectiveness of the controls.